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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,952	10/14/2003	Kaushik Kumar	2003 P 53144 US	3658

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EXAMINER
CLARK, SHEILA V

ART UNIT	PAPER NUMBER
2815	

DATE MAILED: 06/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	**Application No.** 10/684,952	**Applicant(s)** KUMAR ET AL.	
	Examiner S. V. Clark	**Art Unit** 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 11 February 2005.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 2-7,9-16,18-22 and 24-33 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) 2-7,9,12-16,18-22,24 and 27-33 is/are rejected.
7)☒ Claim(s) 10,11,25 and 26 is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2-7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao.

Zhao shows in for example figure 3L a first insulating layer comprising a first dielectric material 306 (low K) and a second dielectric material 310 (silicon dioxide) which may be formed of a different material the first dielectric. A plurality of first conductive regions 304 comprising a first pattern are shown formed in the first dielectric and plurality of second conductive regions 330 which may be formed of two layers (barrier layer and copper- col. 7, lines 55-56) forming a second pattern being different from the first. A two layer hard mask (318, 320) is also shown disposed over the second dielectric.

Since the claims recite first and second dielectric layers comprising said first insulating layer it is deemed that the dielectric layers of Zhao shows obviously comprise a first insulating layer that is obviously characteristically the same though said first layer is Zhao is not labeled as such.

The first dielectric material 306 may comprise an organic material (low K- see col. 4, lines 65-66) and the second dielectric 310 material may comprise an inorganic material (porous silicon dioxide - see col. 5, lines 49-51).

The first dielectric material 306 may also comprise an inorganic material (silicon dioxide- see col. 4, lines 65-66) and the second dielectric material 310 may comprise an organic material (low K-polyimide- see col. 5, lines 44-45)).

Conductive vias (vertical with vertical side walls) and conductive lines are shown representative of the first and second conductive regions.

It would have been further obvious to one having ordinary skill in this art the invention of Zhao are not limited to the suggested materials taught by Zhao since Zhao presents uses language such as "exemplary", " e.g", "preferably" and such which obviously allow for materials having similar characteristics such as those recited in claim 6.

The differing materials of said first and second dielectric are deemed to be able to be etched selective to one another.

The claims contain method of making characteristics (i.e. etchable selective) given no patentable weight in determining the patentability of the final device structure.

Note that a Aproduct by process≡ claim is directed to the product per se, no matter how actually made, In re Hirao 190 USPQ 15 at 17(footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessman, 180 USPQ 324; In re Avery, 186 USPQ 161 and In re Marosi et al, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in Aproduct by process≡ claims, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in Aproduct by process≡ claims or not.

Claims 12-16, 18-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao.

Zhao shows in for example figure 3L a first insulating layer disposed over a plurality of conductive lines in a second insulating layer shown in example the upper most insulating layers (604) in Figure 6. Said first layer comprising a first dielectric material 306 (low K) and a second dielectric material 310 (silicon dioxide) which may be formed of a different material the first dielectric. A plurality of first conductive regions 304 comprising a first pattern are shown formed in the first dielectric and plurality of second conductive regions 330 which may be formed of two layers (barrier layer and copper- col. 7, lines 55-56) forming a second pattern being different from the first. A two layer hard mask (318, 320) is also shown disposed over the second dielectric. Both conductive lines of Zhao may comprise copper and as the dielectric materials suggested by Zhao are deemed to be like those recited in the claims it would have been obvious to one having ordinary skill in this art that the CTE of the first dielectric could be close to the CTE of the conductive lines.

Since the claims recite first and second dielectric layers comprising said first insulating layer it is deemed that the dielectric layers of Zhao shows obviously comprise a first insulating layer that is obviously characteristically the same though said first layer is Zhao is not labeled as such.

An upper most cap layer is shown formed over said second insulating layer in figure 6 and is obviously deemed to be characteristic of cap layer 332 (i.e. silicon nitride) shown in figure 3L.

Col. 9 teaches that one or layers may obviously be formed over the structures taught in the various views, which would obviously include layers adhesively formed thereto. Further semiconductor substrates are typically formed with protective adhesive cover. So to therefore form a protective cover over the figures taught by Zhao would have been obvious to one having ordinary skill in this art for the purpose of protecting the surface of the chip from environmental circumstances as external stresses, unwanted particulate materials, etc.

The first dielectric material 306 may comprise an organic material (low K- see col. 4, lines 65-66) and the second dielectric 310 material may comprise an inorganic material (porous silicon dioxide - see col. 5, lines 49-51).

The first dielectric material 306 may also comprise an inorganic material (silicon dioxide- see col. 4, lines 65-66) and the second dielectric material 310 may comprise an organic material (low K-polyimide- see col. 5, lines 44-45)).

Conductive vias (vertical with vertical side walls) and conductive lines are shown representative of the first and second conductive regions.

The differing materials of said first and second dielectric are deemed to be able to be etched selective to one another.

The claims contain method of making characteristics (i.e. etchable selective) given no patentable weight in determining the patentability of the final device structure.

Note that a Aproduct by process≅ claim is directed to the product per se, no matter how actually made, In re Hirao 190 USPQ 15 at 17(footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessman, 180 USPQ 324; In re Avery, 186 USPQ 161 and In re Marosi et al, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in Aproduct by process≅ claims, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in Aproduct by process≅ claims or not.

Claims 24, 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhao.

Zhao shows in for example figure 3L a work piece 302, a first insulating layer disposed over a plurality of conductive lines in a second insulating layer shown in example the upper most insulating layers (604) in Figure 6. Said first layer comprising a first dielectric material 306 (low K) and a second dielectric material 310 (silicon dioxide) which may be formed of a different material the first dielectric. A plurality of first conductive regions 304 comprising a first pattern are shown formed in the first dielectric and plurality of second conductive regions 330 which may be formed of two layers (barrier layer and copper- col. 7, lines 55-56) forming a second pattern being different from the first. A two layer hard mask (318, 320) is also shown disposed over the second dielectric. Both conductive lines of Zhao may comprise copper and as the dielectric materials suggested by Zhao are deemed to be like those recited in the claims it would have been obvious to one having ordinary skill in this art that the CTE of the first dielectric could be close to the CTE of the conductive lines.

An upper most cap layer is shown formed over said second insulating layer in figure 6 and is obviously deemed to be characteristic of cap layer 332 (i.e. silicon nitride) shown in figure 3L.

Col. 9 teaches that one or layers may obviously be formed over the structures taught in the various views, which would obviously include layers adhesively formed thereto. Further semiconductor substrates are typically formed with protective adhesive cover. So to therefore form a protective cover over the figures taught by Zhao would have been obvious to one having ordinary skill in this art for the purpose of protecting the surface of the chip from environmental circumstances as external stresses, unwanted particulate materials, etc.

The first dielectric material 306 may comprise an organic material (low K- see col. 4, lines 65-66) and the second dielectric 310 material may comprise an inorganic material (porous silicon dioxide - see col. 5, lines 49-51).

The first dielectric material 306 may also comprise an inorganic material (silicon dioxide- see col. 4, lines 65-66) and the second dielectric material 310 may comprise an organic material (low K-polyimide- see col. 5, lines 44-45)).

Conductive vias (vertical with vertical side walls) and conductive lines are shown representative of the first and second conductive regions.

It would have been further obvious to one having ordinary skill in this art the invention of Zhao are not limited to the suggested materials taught by Zhao since Zhao presents uses language such as “exemplary”, “ e.g”, “preferably” and such which obviously allow for materials having similar characteristics such as those recited in claim 32.

Claims 2-7, 9, 12-16, 18-22, 24, 27-33 are rejected.

Claims 10, 11, 25, 26 are objected to as being dependent upon a rejected base claim, but would be allowable over the prior art of record if rewritten in independent form including all of the limitations of the base claim and any intervening claims because the references such as Brennan et al teach use of SIC as a hard mask layer but fail to teach the structural combination recited in the claims of the instant invention taken along with the material structure recited in the three layer structure of claims 10 and 25 or the two layer structure recited in claims 11 and 26.

Brennan et al is cited to show use of SIC in mask layers.

The finality of the last office action has been rescinded so that the rejections above may be rendered.

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication should be directed to S. V. Clark at telephone number (571) 272-1725.

S. V. Clark
Primary Examiner
Art Unit 2815

June 4, 2005